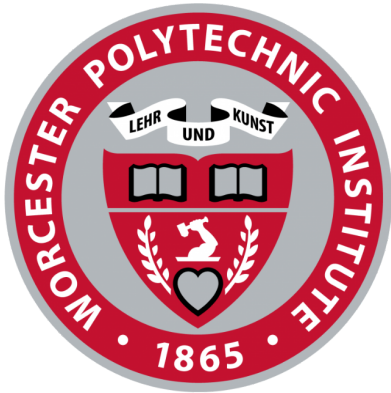


Glacier National Park Employee Housing



WPI

An Interactive Qualifying Project submitted to the faculty of
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfillment of the requirements for the Degree of Bachelor of Science

Sponsored by: Glacier National Park, West Glacier, MT.
Submitted to Glacier National Park and Worcester Polytechnic Institute
Advised by: Dr. Robert Traver and Dr. Seth Tuler

Submitted to Glacier National Park and Worcester Polytechnic Institute

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Date: October 12, 2022

This report represents the work of one or more WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on the web without editorial or peer review.

Abstract

Glacier National Park administration has faced challenges providing housing to their workforce for over two decades, mainly due to funding issues. The purpose of this project was to provide Park administration with strategies to help improve their employee housing. These strategies emerged from interviews with over 50 National Park Service administrators, Glacier National Park contacts, and local housing entities. The most applicable strategies include exploring use of Conservancy funding, creating joint housing with other government agencies, expanding the School-to-Park program, and leasing housing in the external communities. Implementation of these strategies, and others mentioned in our recommendations, will increase and improve employee housing in Glacier National Park.

Acknowledgements

We would like to thank the many people who made this project possible.

From Glacier National Park, we would like to recognize and thank the many different members of the staff who have helped us accomplish our project goal. Thank you especially to our project sponsors, Chief of Administration Emily Keil, Chief of Facilities Jim Foster, and Housing Manager Erin Madsen. Their wealth of knowledge about Glacier National Park and the National Park Service as a whole is unmatched. Their continued support and direction made this project the best it could be.

We would also like to thank all the NPS employees we interviewed about housing in their parks and surrounding regions. If not for their responses, our project would not have been possible.

We would like to acknowledge the realtors and landlords in the surrounding communities for sharing their insights on housing in the area.

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Executive Summary

Purpose

Glacier National Park (GLAC) has faced challenges providing an adequate amount of housing to their permanent and seasonal workforce for over two decades. These challenges have been exacerbated by an increased demand for employees and a scarcity of housing in the local community. The purpose of this project was to identify housing strategies implemented at other National Parks, and assess their applicability to GLAC.

Recommendations

We provided a total of seven recommendations for the short term, long term, and for Park partnerships. Short term recommendations can be completed within five years. Long term recommendations may take more than five years. Park partnership recommendations have no timescale and require discussion with external entities to help provide housing to the park.

Short Term

- Shift to a shared office space model with hybrid workers to allow the conversion of offices to housing in administrative areas, and explore hiring remote workers to reduce the need for housing in the Park and its surrounding communities.
- Continue the School-to-Park program with Columbia Falls High School and expand it to other local high schools in the Flathead Valley with trade programs.
- Explore external leasing opportunities in the Flathead Valley and apply for WASO Park Lease Assistance to help fund this if available.

Long Term

- Explore GSA funded leasing to enable GLAC to sign long-term leases with landlords in the Flathead Valley.
- Renegotiate Park concessionaire contracts to regain Park housing, while working with concessionaires to expand concessionaire housing off Park land.

Partnerships

- Collaborate with other government entities in the area that require housing, including the Bureau of Reclamation at the Hungry Horse Dam and the US Forest Service in the Flathead National Forest.
- Continue talks with the Glacier Conservancy, who have indicated that they would consider supporting expanded Park housing given a cohesive housing plan that demonstrates how and where expanded housing would benefit the Park.

Deliverables

We developed a database of housing strategies found across the NPS from coded interview responses for future reference by GLAC administration. We developed a leasing decision matrix to assist the Park in ranking leasing options in the local area based on a list of criteria. This matrix enables the Park to set the weights of each criterion and give a set of potential properties ratings for each, calculating a final score for each.

Methodology

To form these recommendations, we interviewed 46 National Parks, three NPS regional managers, two Washington Support Office (WASO) housing officers, five members of GLAC administration, the Glacier Conservancy, 24 landlords, a realtor, and a property developer. We coded interviews with National Parks to extract a list of housing strategies in the National Park Service (NPS) and understand the current state of housing across the NPS. Interviews with the regional managers and WASO housing officers indicated the current and future plans of the NPS regarding housing, and provided information on how funding was allocated to housing projects. Interviews with members of GLAC administration gave insight into the housing challenges in and around GLAC and information on the current state of talks with various partners around the park. An interview with the Glacier Conservancy gave insight into the willingness of the Conservancy to sponsor housing-related projects in the future. Interviews with landlords, a local realtor, and a property developer gave us information about the housing market in the surrounding communities and the willingness of landlords in the surrounding communities to rent housing long-term to the Park.

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1.0 Introduction

This project focused on Glacier National Park, established on May 11th, 1910. The Park is located in northwest Montana and draws over three million visitors each year (National Park Service (NPS), 2021). To accommodate its visitors, Glacier National Park hires about 350 seasonal employees a year during peak season and around 90 permanent employees. This increases the strain on available housing facilities within the Park and the external communities for both permanent and seasonal employees (NPS, 2018).

Glacier National Park administration has faced significant challenges providing adequate housing for these employees for well over two decades (NPS, 1999). Housing options both inside and outside the Park have been negatively impacted by a lack of availability, affordability, and quality. Within the Park, there is a shortage of beds and housing options that meet the needs of the employees. Outside the Park, there are long wait lists for apartments, lease lengths incompatible with the six-month tenure of seasonal employees, and rental rates inaccessible to those with lower pay grades. Job postings that do not guarantee housing have received fewer applications than those that do. Job offers awarded to applicants that do not guarantee housing are often turned down, causing difficulty finding employees for those positions (E. Keil, personal communication, April 14, 2022). Housing challenges are shared across the National Park Service, albeit with different specifics.

The purpose of this project was to identify housing strategies implemented at other parks and assess their applicability to Glacier National Park. Two objectives were completed to achieve this goal. First, we contacted housing and facilities managers at 100 National Park units (NPs) across the country to learn about housing challenges they face and what strategies they have used to improve their park's housing situation. These responses were entered into a database for future reference. Second, we analyzed and delivered a set of strategies Glacier National Park administration could explore to increase their housing supply. This list was made up of strategies other National Parks have used and strategies Glacier National Park administration is aware of and asked us to explore further. Strategies were analyzed based on their relevance to Glacier National Park and its local community. A decision matrix was developed to determine the applicability of leasing options near the Park. The interview database, housing strategy recommendations, and leasing decision matrix were submitted to our sponsors, Chief of Facilities Jim Foster, Chief of Administration Emily Keil, and Housing Manager Erin Madsen, at Glacier National Park for use in determining future housing strategies.

2.0 Background

The background chapter explores housing in and around Glacier National Park in the past and present. The supply and demand for housing are large factors in the housing shortage currently faced by the Park. We examined the effects of the housing problem on the Park's operation, and discussed the previous housing strategies.

2.1 Housing Demand In and Around Glacier NP

Glacier National Park (GLAC) is facing an increasing demand for seasonal and permanent employees to operate the Park at full capacity (P. Webster, personal communication, Sept. 29th, 2022). This increases the demand for housing both inside and outside the Park. Increased recreational visitation has also driven an increase in demand for nightly rentals and properties outside the Park (Bigart et al., 2021). Due to remote work, many out-of-state visitors have bought homes in the surrounding area, decreasing the availability of housing for local residents who cannot afford to outbid the new residents (Local Property Manager, personal communication, Sept. 29, 2022). Easier access to loans for those in the market for a home in the last two years has also increased demand (Mac, n.d.). This has resulted in an increase in average renting and purchase prices around the Park. Other parks have also been dealing with challenges relating to employee housing (Sonken, n.d.). These dynamics reflect more general trends throughout the US, especially during and after the COVID-19 pandemic (Bernstein, Tedeschi, Robinson, Sept. 9, 2021).

2.2 Housing Supply In and Around Glacier NP

The Park provides some housing for both seasonal and permanent employees, as well as for short-term researchers, volunteers, and interns. Internal housing is available for some employees, but the Park housing stock does not meet employee demand. GLAC faces an employee housing deficit due to record visitation requiring more staff and a lack of funding for housing construction (Statista Research Department, 2022). Consequently, many employees seek housing outside the Park in nearby communities.

2.2.1 Internal Housing Supply

GLAC provides internal housing in West Glacier, East Glacier, St. Mary, Many Glacier, Goat Haunt, Polebridge, Walton, Two Medicine, Lake McDonald, and Rising Sun. These locations and housing quantities are depicted in Figure 1, totaling 299 beds across 158 units. Units consist of houses, apartments, cabins, dorms, n-plexes, and mobile homes. Single-family homes and apartments make up about 90% of total units and nearly 80% of the beds (E. Madsen, personal communication, Sept. 9, 2022). Internal housing supply alone does not meet the housing demand of Park employees.



Figure 1: Total units and beds available by location throughout Glacier National Park in 2021.

Internal housing supply has been negatively affected in the past decade for three main reasons. First, contracts between GLAC and their concessioners allow them to utilize a portion of Park housing for concessioner employees, reducing the units available to GLAC employees (GLAC Chief of Commercial Services, personal communication, Sept. 22, 2022). Second, GLAC has lost housing units over the years due to a lack of funding to perform maintenance (NPS, 2015). Third, capacity was lost as a result of the COVID-19 pandemic, when housing density was reduced to comply with CDC guidelines (NPS, 2022a).

Federal NPS policies inhibit attempts to increase the amount of internal housing, limiting options for housing construction in the Park. NPS conservation concerns limit possible housing locations to pre-developed areas to avoid further disturbing natural resources within the Park (NPS, 2015). NPS policies further prohibit new additions of trailer and tent units for employee housing (NPS Regional Housing Manager, personal communication, Sept. 15, 2022). The Freeze the Footprint and Reduce the Footprint policies limits the creation of new office or warehouse space (Obama Administration, n.d. a; n.d. b). These policies deter the Park from converting existing office space to housing units due to an inability to replace those office buildings (J. Foster, personal communication, Aug. 30, 2022).

2.2.2 External Housing Supply

External housing is located in the Flathead Valley to the west and the Blackfeet Indian Reservation to the east. GLAC Chief of Administration Emily Keil stated that external housing was unavailable for many employees. For landlords, nightly rental platforms such as Vrbo and Airbnb provide the potential for higher revenue than what can be obtained from renting month-to-month to Park employees (Local Property Manager, personal communication, Sept. 29, 2022). This potential for increased profit has led to a shortage of landlords renting month-to-month during peak season. There are few rental units in the price range of seasonal and permanent Park employees, and the rates charged often cannot be covered by a dual-income household (E. Keil, personal communication, Aug. 30, 2022).

The Park has explored leasing external properties for their employees, but there is a shortage of affordable month-to-month units available to the Park. A landlord wishing to lease directly to the Park must sign up on SAM.gov, a federal contractor database. SAM.gov is widely regarded as complex and deters landlords, while private-sector leasing is easier and more profitable (Intermountain Regional Housing Program Manager, personal communication, Sept. 15, 2022). Given the lack of affordable housing and complexity in leasing directly to the Park, external housing is sometimes an infeasible option for Park employees.

2.3 Consequences of Lack of Housing at Glacier NP

The lack of housing has significant consequences for the Park. During the 2022 season, GLAC was unable to hire the employees required for full Park operation. In some cases, employees who were not granted Park housing failed to find their own housing outside the Park and were unable to accept their job offers. The closures of two fee stations in Two Medicine and Many Glacier are examples of the effects of this employee shortage. While closed, these entrance stations were still being used by visitors to enter daily, but fees were unable to be collected at those stations. Due to this closure, GLAC is expected to only collect 70% of expected entrance fees for the 2022 season (J. Foster, personal communication, August 30, 2022). This loss of revenue puts a strain on funding for the Park and reduces the Park's ability to complete its mission and serve its visitors.

2.4 Recent Efforts to Provide Adequate Housing For Glacier NP Employees

GLAC has made efforts in recent history to improve its housing. After the removal of twelve dilapidated trailers from St. Mary in 2014, two housing projects were undertaken to improve housing supply on the east side of the Park (NPS, 2016). A duplex was constructed in East Glacier, containing two 2-bed/2-bath units, providing quarters for at least two and up to four employees (NPS, 2015). A fourplex was constructed in the Swiftcurrent housing area at Many Glacier, containing two 2-bed/2-bath and two 1-bed/1-bath units, providing quarters for at least six and up to eight employees (NPS, 2015).

A School-to-Park program is a partnership between a local school and a National Park that allows local students to build housing units for a Park. GLAC's School-to-Park program was

established as a partnership with Columbia Falls High School to construct one cabin every year for employee housing (NPS, 2020a). Materials are provided by GLAC administration and the Glacier NP Conservancy, using funds appropriated from an unconstructed eightplex and public donations (J. Foster, personal communication, Aug. 30, 2022; Glacier NP Conservancy, personal communication, Sept. 29, 2022). Funding for eight cabins was secured, and three have been completed as of August 30th, 2022 (J. Foster, personal communication, Aug. 30, 2022).

2.5 An Urgent Need to Address the Housing Challenges

GLAC has attempted to address the lack of affordable employee housing for many years with minimal success. Increased housing demand near National Parks puts a strain on their employee housing and therefore critical park operations. A comprehensive view of how other parks have housed their employees will assist GLAC in learning applicable strategies that were feasible for similar National Parks.

3.0 Methodology

This methodology presents the methods we used to obtain information about housing in the local communities and throughout the NPS. To learn about housing in and around GLAC, we conducted interviews with members of GLAC administration. To learn more about housing in the local area, we conducted interviews with local landlords and realtors. To learn about housing in and around other National Parks, we conducted interviews with NPS housing managers and regional/national administrators. We coded and analyzed these interviews to develop housing strategy recommendations for GLAC. We created a tool to analyze leasing options in the local community to aid GLAC in further pursuits of that strategy.

3.1 Obtain Information About Housing in the Local Area and Strategies Implemented at Other NPs

To accomplish our goal of providing GLAC administration with potential housing strategies, our first objective was to understand housing in the local area and efforts to provide housing at other National Parks. The local housing community plays a large role in how the Park operates its housing. Other NPs were contacted because a housing strategy from one park has the potential to assist other parks. We contacted NPS administrators, GLAC-affiliated contacts, and local housing entities to gather this information, listed in Table 1.

Contact Group	Contacts	Number Contacted
NPS administrators	100 National Park Housing Managers, 6 Regional Housing Managers, 2 WASO Housing Officers	108
GLAC-affiliated contacts	Our 3 GLAC sponsors, GLAC Chief of Commercial Services, GLAC Deputy Superintendent, Glacier NP Conservancy	6
Local housing entities	24 landlords, a realtor, and a property developer	26

Table 1. The three main groups of contacts used to gather information of housing locally and across the NPS, and quantity of contacts in each group.

3.1.1 Contact Selection

Jim Foster, the GLAC Chief of Facility Management, provided us with ideas for selecting NPS sites to contact about their housing situations (J. Foster, personal communication, September 9, 2022). These ideas became the set of criteria we used to select parks:

- One hundred National Parks (Parks, Monuments, Seashores, etc...)
- A representative sample from NPS Regions (Midwest, Northeast, Southeast, etc.)
- A representative sample of parks by physical size and visitor metrics
- Parks that provide employee housing

Using these criteria, a stratified sample of parks was selected from nps.gov (NPS, 2020b). This sample of parks consisted of all designated National Parks with facilities, totaling 63, and a further 37 representative National Park sites, such as National Battlefields, Preserves and Monuments. Park contacts were obtained through Regional Managers and nps.gov. Our sample of parks is listed in full in Appendix A. Figure 2 shows that the parks selected meet our criteria of being representative of the seven NPS regions. Figure 3 shows that the parks selected meet our criteria of being representative of a wide range of physical sizes and visitation numbers (NPS IRMA Portal, 2021; NPS, 2022b).

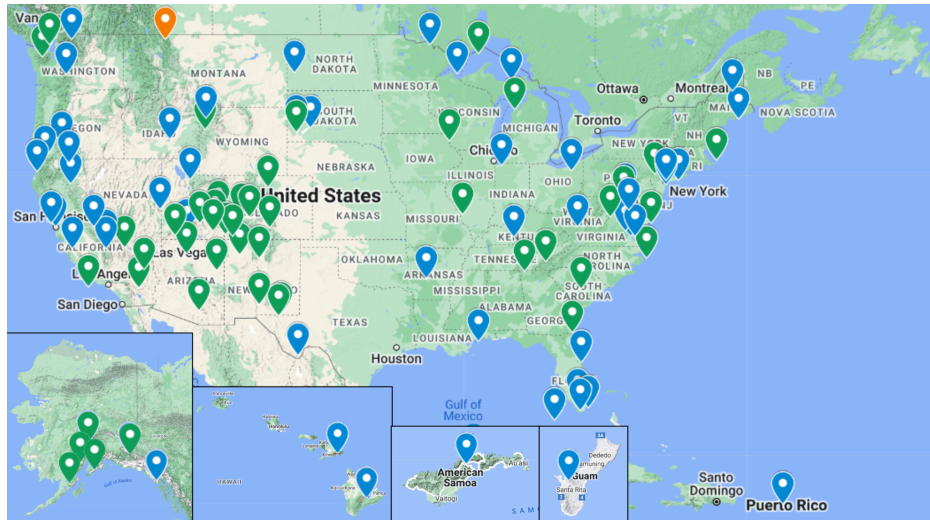


Figure 2: Distribution of selected parks. Parks with completed interviews are marked with green pins. Parks we contacted but did not interview are marked with blue pins. The location of GLAC is marked with an orange pin.

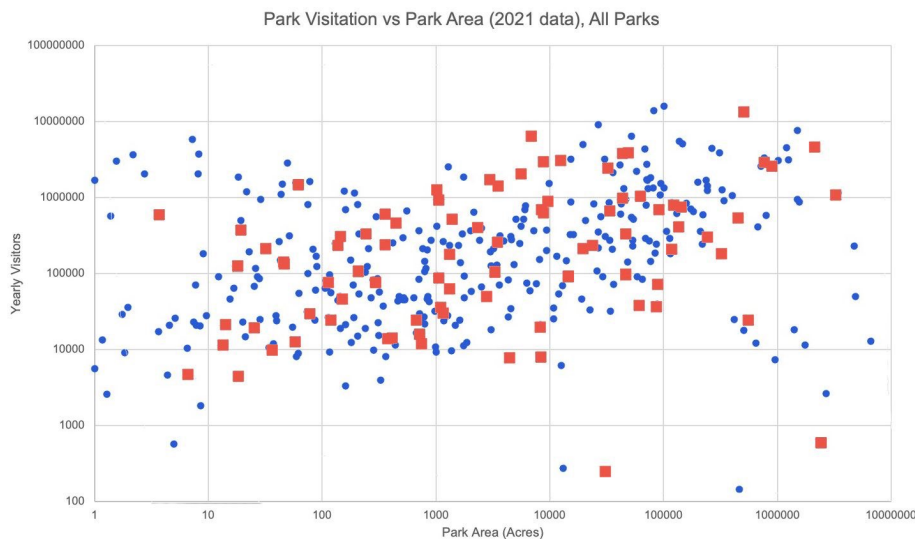


Figure 3: Selected parks (red squares) and non-selected parks (blue circles), graphed by park area and yearly visitors, logarithmically scaled.

We selected NPS administrators for their expertise in housing on the local, regional, and national scales. We selected members of GLAC's administration for their knowledge of GLAC's housing situation. We selected the Glacier NP Conservancy for its interest in the Park's mission. These contacts were received from our sponsors and other NPS administrators.

We selected local housing entities because of their knowledge of Flathead Valley's housing market. We found these contacts through our sponsors, a local landlord, and via the rental listing websites [realtors.com](https://www.realtors.com) and [hotpads.com](https://www.hotpads.com).

3.1.2 Interviewing Contacts

All interviews began with an introduction of who we were and explained the intent of our project. We stated that the interviewee's responses would be recorded, then read a confidentiality statement. We informed the interviewees that they would be publicly anonymous, that they may decline to answer any question, and that they may leave the interview at any time. Any information gathered in these interviews was stored confidentially and would be destroyed if requested by the interviewee.

National Park housing managers were interviewed about the housing situation at their respective parks. First, we asked about the statistics on their employee count and the breakdown of permanent and seasonal employees. We then shifted to more open-ended questions about the current condition, quantity, and future plans for employee housing in their park. The information we gathered from these questions provided specific details on housing plans, funding sources, and housing related partnerships. We also asked about the park's relationship with outside entities in terms of housing. Our final question gave the interviewee the opportunity to add or expand on anything they felt had not been adequately discussed. The templates for interview questions can be seen in Appendix B (voice/video calls) and Appendices C and D (emails).

Questions for GLAC and NPS administrators depended on each interviewee's area of expertise. We conducted these interviews with the intent to learn about the interviewee's view of the housing situation at their level, be that GLAC, regional, or national. We asked how they believed GLAC or NPS housing would change in the future, and about any strategies they viewed as particularly successful in the past. We asked about NPS funding and how they believed it could be best used to address housing challenges.

We conducted interviews with the local housing entities to learn about each interviewee's view of the housing situation in the local area. Questions involved learning their views on local housing prices, affordability for the seasonal workforce in the GLAC area, leasing opportunities in the GLAC area, and nightly rentals.

Interviews with NP housing managers allowed us to learn more about employee housing in their park's area and region. Successful National Park interview rates for each region are shown below in Table 2. NPS regional managers and WASO housing officers were interviewed to learn about general housing policies, funding, and leasing opportunities across the NPS. We interviewed the GLAC Chief of Commercial Services and GLAC Deputy Superintendent to learn about the future of housing in GLAC. The Glacier NP Conservancy was interviewed to assess

interest in future philanthropic work regarding housing in the Park. We interviewed housing entities in the local community to learn about the real estate market in the Flathead Valley.

Region:	Initial Contact Rate:	Full Interview Rate:
Intermountain	92%	88%
Alaska	83%	67%
Midwest	53%	33%
Northeast	53%	20%
Capitol	50%	50%
Southeast	43%	36%
Pacific West	36%	24%

Table 2: Contact rates through all 7 NPS regions. Initial contact is defined as establishing communication with the park, while a full interview is defined as completing an interview.

3.1.3 Creation of NPS Housing Strategies Database

We coded each park's housing manager interview and summarized the main housing strategies. Using coded and analyzed interviews, we organized strategies by frequency and created a database for analysis. We used this database to show common NPS-wide strategies as well as promising options to explore further. For example, the database presented strategies parks are using that GLAC has not explored. We used the database to pick housing and leasing strategies for further analysis.

3.2 Assessment of Housing Strategies for Glacier NP

We discussed housing strategies with our project sponsors, members of GLAC administration, and local community members to determine their feasibility in the GLAC area. We analyzed strategies based on how common they were, as well as their applicability to GLAC. After discussions with GLAC administration, we omitted common strategies among other National Parks if they were not applicable to GLAC. We also included strategies that were unique to a few parks that were highly applicable to GLAC according to GLAC's administration. Results of these discussions enhanced our ability to produce more comprehensive recommendations.

3.3 Assessment of Leasing Strategies for Glacier NP

Leasing was identified as an area of focus by GLAC administration. We extracted information on employee needs and government regulations from our interviews with GLAC

administrators and NPS housing managers and administrators. We used this information to develop a preliminary criteria set for the analysis of leasing strategies. We organized this set of criteria into a decision matrix for GLAC administration.

Through meetings with our Park sponsors, we were given feedback on the criteria and improved our matrix to include their expert opinions. In the matrix, we coded the criteria into five categories:

- Costs
- Accessibility
- Quality & Amenities
- Renting Feasibility
- Covered Residents

This matrix allows for quantitative comparisons between different leasing options. The leasing decision matrix is shown in Appendix E.

4.0 Findings

The findings presented below are organized by examples of internal housing strategies implemented across the NPS, external housing strategies implemented across the NPS, and common challenges among interviewed park housing managers.

4.1 Internal Housing Examples from NPs

Internal housing is beneficial to parks because it places employees on-site where they need to work and avoids reliance on external communities to provide housing. Internal housing strategies that emerged from coded interviews, their categories, and the number of parks utilizing this strategy are displayed in Table 3. Strategies are classified as structure-related, funding-related, or partnership-related. The number of parks that utilize each strategy are listed to display how common each strategy is. Each housing strategy, with its benefits and detriments, is discussed in detail in the following sections.

Internal Housing Strategy	Strategy Category	Number of Parks
Houses	Structure-related	30
Apartment-style units	Structure-related	20
RV spaces	Structure-related	19
Dormitories	Structure-related	15
N-plexes	Structure-related	13
Trailers	Structure-related	5
Line-Item funding	Funding-related	5
Conservancy aid	Funding-related	4
Tiny houses	Structure-related	4
Dry cabins	Structure-related	4
School-to-Park	Partnership-related	3

Table 3: Internal housing strategies implemented at National Parks.

4.1.1 Existing Housing Structures in the NPS

Most parks that provide housing to their employees do so in the form of houses, apartment-style units, dormitories, n-plexes, cabins, or trailers. Utilization of existing housing benefits the park because it does not require large capital investment and is only subject to yearly

maintenance. These units are useful for many types of park employees. Dorms, apartment-style units, trailers, and cabins may be used for seasonal workers, volunteers, and interns. Houses and n-plexes are better suited for permanent employees and their families. While these strategies may have been more feasible in the past, new construction is difficult due to NPS conservation policies. Existing housing has fallen into disrepair due to deferred maintenance, and funding is difficult for new housing construction projects.

4.1.2 Construction of RV Pads

RV pads are considered a cost-effective strategy for several National Parks, with over 30% of interviews citing RV pads as a strategy to alleviate the housing crisis in their park. RV pads are a slab of concrete that come with utility hookups for RVs to plug into, including water, electricity and sewage. The Assateague National Seashore Housing Manager stated that they added trailer pads with full hookups for employees with RVs due to the RV pad's low cost. Great Sand Dunes NP's housing manager shared their plan to use part of a line-item construction project to add additional RV sites that came with shared laundry facilities. The usage of RV pads in 8 NPs we interviewed shows that this strategy does meet the necessary regulations and is affordable with the budget that parks work with. RVs only provide housing for one to two employees per unit, and employees must also provide their own RV to utilize this strategy. Securing the space for RV pads may also be difficult due to NPS conservation requirements. An example of an RV pad is shown in Figure 6.



Figure 6: An example of an RV Pad, located in Yellowstone National Park

4.1.3 Construction of Tiny Houses

A tiny house is defined as any home that is less than 500 square feet and is designated by the National Park Service as a "Park Model RV". Four parks have implemented tiny houses as an economically efficient way of expanding housing. Rocky Mountain NP has several units in use

for seasonal employees and would add more if they were allowed to. Wrangell-St. Elias' housing manager explained that the Park funded a tiny home built in Denali that was transported to the Park. The use of tiny houses as employee housing within the NPS indicates that they meet the necessary policy and regulation requirements to be considered as a usable housing unit. While tiny houses are a viable option for parks to add to their housing stock, employees with families cannot benefit from this option, as tiny houses are typically built for one to two people. An example of a tiny house is shown in Figure 7.



Figure 7: An example of a tiny house, located in Grand Canyon National Park

Note: From *Grand Canyon: Phantom Ranch Cabin 0118* [Photograph], by Grand Canyon National Park, 2006, Flickr (https://www.flickr.com/photos/grand_canyon_nps/5951165007). CC BY 2.0.

4.1.4 School-to-Park Programs

A School-to-Park program is a strategy currently implemented at three parks. GLAC has been partnering with a local high school to create one 2-bed/2-bath cabin per year. Wrangell-St. Elias and another NP both work with nearby high schools to create tiny houses for their parks. Another NP worked with the University of Southern California (USC) and its architecture program to design tiny houses for the park. They plan to install them on land owned by a partner just outside the park boundary. USC did the fundraising for this program, and the installation is on land with water and power (NPS Park Administrator, personal communication, Sept. 21, 2022). These programs are marketable to the public and benefit both the park and the students. A drawback of this program is the limited housing it provides, adding only one unit each year. The park is still required to provide the funding for materials, but does not have to hire an external contractor. An example of a School-to-Park program cabin is shown in Figure 8.



Figure 8: A cabin of similar size was made by the Columbia High School trade class
 Note: From *cabin 11 is 2 bedroom at Occoneechee State Park* [Photograph], by Virginia State Parks, 2014, Flickr (<https://www.flickr.com/photos/vastateparksstaff/47058887224>). CC BY 2.0.

4.1.5 Use of Conservancy Funding for Internal Housing

A NPS conservancy is a philanthropic organization dedicated to preserving and protecting National Parks for future generations. Parks with conservancies have access to funding and operational processes that parks without don't. One NP's conservancy donated trailers to the park to expand employee housing. The management of these units is done by the park's conservancy, reducing future financial strain on the park (NPS Park Administrator, personal communication, Sept. 21, 2022). Conservancy funds may be difficult to secure because housing projects may not align with the mission of the conservancy.

4.1.6 Line-Item Funding

Line-item funding was raised by five interviewees as a possibility for expanding housing stock. Several parks have utilized line-item funding for major housing projects, such as Yellowstone NP and Grand Canyon NP (E. Keil, personal communication, Sept. 28, 2022). Line-item funding is requested on the yearly budget request for a park, and must be submitted to Congress and passed on a Congressional funding bill. This funding source is reserved for large-scale projects, and project proposals receive much more scrutiny than if they were funded with internal funding sources (J. Foster, personal communication, Sept. 28, 2022). Large scale construction projects that add dozens of beds at once are possible using this funding. Line-item funding requests typically take years to get approved, and even longer to be voted on before the money becomes available, so they are not considered a regular or dependable source of funding.

4.2 External Housing Examples from NPs

External housing is beneficial to parks because it utilizes external land and communities to provide housing for park employees. External housing strategies that emerged from coded

interviews, their categories, and the number of parks utilizing each strategy are displayed in Table 4. Strategies are classified as partnership-related, policy-related, funding-related, or no action. The number of parks that utilize each strategy is listed to display how common each strategy is. Each housing strategy and its benefits and detriments are discussed in detail in this section.

External/Other Strategy	Strategy Category	Number of Parks
Employees live in external community	No action	31
Joint building with other agencies	Partnership-related	11
External leasing	Policy-related	9
WASO lease program	Funding-related	8
Conservancy aid	Funding-related	4
Hiring locals	No action	4
Remote Work	Policy-related	1

Table 4: External housing strategies implemented at National Parks.

4.2.1 Finding Housing Through Inter-Government Agency Collaboration

From our interviews, 11 parks have collaborated in some way with other government agencies. These agencies include the US Fish and Wildlife Services, Bureau of Land Management, military bases, and other National Parks nearby. The NPS is often more stringent on housing requirements than other agencies, so some parks have utilized shared bunkhouses on the other agency's land (NPS Housing Manager, personal communication, Sept. 13, 2022). Federal requirements make it difficult to partner with agencies not in the Department of the Interior, like the US Forest Service.

4.2.2 Leasing Housing in the External Community

The ability to lease housing in the external community was a topic discussed by several parks. San Juan Island NHP has been solely leasing housing for the past decade and worked with a local developer to build housing for the park in the local community. San Juan Island has also had success in providing their employees with many quality leased housing units using this strategy. Several other parks lease housing in the local communities, due to loss of internal housing capacity from natural disasters. Finally, many parks expressed interest in leasing, but

stated that the local communities were either too far or too expensive for leased housing to be worth considering.

The WASO Park Lease Assistance program aims to assist parks in affording leased housing in their external communities. This program will make up for the difference between standardized government housing rents and the unit's lease price for sub-year leases. This essentially provides leased employee housing at no cost to the Park for the duration of the program, if leases and funding can be acquired. Funding for this program has been requested but not yet approved by Congress. WASO believes that leasing is a long-term solution for the NPS. (WASO Housing Program Support, personal communication, Oct. 6, 2022).

After researching local community leasing options, there appeared to be willingness from landlords to rent to the Park. This can be seen in Appendix F. The timing of our research coincided with the end of the tourist season, which may have contributed to the slight increase of units that were listed as monthly rentals. Leasing to a National Park can be difficult for landlords due to the complex government approval system, discouraging many landlords from leasing to the park. An example n-plex nightly/monthly rental unit is shown in Figure 9.



Figure 9: An example of a rental unit near Glacier National Park.

Note: *Rental Unit in Montana* [Photograph], by Austin Rebello, 2022. CC BY 2.0.

4.2.3 Use of Conservancy Funding for External Housing or Leasing

In some NPs, conservancy partnerships have enabled the park to lease housing directly from the conservancy. One conservancy bought a nine-bedroom house to lease directly to the park at an affordable rate (NPS Housing Manager, personal communication, Sept. 13, 2022). Having the conservancy operate this unit also helps the park reduce the maintenance they would otherwise be responsible for. In Rocky Mountain NP, the conservancy built two four-bedroom

bunkhouses to lease to the park in the same way. Conservancies may be unwilling or unable to work with their parks to lease or buy external units because they face the same problem of limited or unaffordable real estate. Other concerns may be raised regarding the maintenance of units the conservancy buys to lease long-term to the NPS.

4.2.4 Expanding Remote Work to Reduce Employee Housing Demand in the Park

Emily Keil, Jim Foster, and the GLAC Chief of Commercial Services discussed the possibilities of remote work at GLAC. While remote work is not viable for many visitor facing, scientific, and park maintenance positions, there are some positions where either hybrid or fully remote work is feasible. For example, a budget analyst position at GLAC is currently held by an employee who does hybrid work. Expanding remote work would reduce the need for employee housing inside the park and in the external communities. A major drawback of moving employees to remote work is the reduced interaction with coworkers in ways that would otherwise build camaraderie in the community.

4.2.5 No Action Alternative: Employees Find Housing in External Communities

Most National Parks expect employees to find their own housing. While this is a lack of a housing strategy, it is sometimes a good option for the park and its employees. These parks may also hire employees directly from the local community, but other parks are remote and cannot expect their employees to commute for hours. There are many NPs with local communities that are unaffordable to park employees. Internal housing is often used for non-permanents who cannot buy or lease housing in surrounding communities.

4.3 Common Challenges Across NPS

National Parks face many barriers when adding to their housing, and they utilized the strategies discussed above to improve employee housing in the past. Several common housing challenges emerged throughout our interviews, including funding challenges, distance from local communities, difficulty with local communities, employees' preferences, and government regulations. The following sections explain these challenges.

4.3.1 Funding Challenges Limit Housing Inventory Expansion

The most common problem identified amongst interviewed park housing managers was a lack of adequate funding to address the housing crisis. The lack of adequate funding can be attributed to an absence of funding for new construction projects, a lack of priority in the eyes of WASO, and a lack of funds from park revenue that are allowed to be allocated towards housing. One housing manager stated, “[there] is no funding that exists for new construction”. Another housing manager stated that “there's no [housing] fund source from Washington”. This has caused parks to “just get by” in terms of housing.

A Regional Housing Manager stated that WASO does not prioritize housing initiatives through line-item funding because these initiatives have scored poorly on many metrics used to evaluate project proposals. Such factors include whether a project is visitor facing, culturally preserving, or environmentally conserving.

According to a NPS Regional Housing Manager, housing-specific funding does exist, but is spread thin across all NPs. Without help from Washington, parks must rely on their own revenue, but there are strict regulations that define how funds can be used. Funds collected from visitor-facing sources (such as entrance tickets) can only be used to fund projects and programs that are visitor-facing. The only park account funds that can be used for housing construction and maintenance are the rent collected from employees in NPS housing and the general appropriation given to housing (J. Foster, personal communication, Aug. 30th, 2022). Insufficient rental income has led to a buildup of deferred housing maintenance over the years, and housing projects must compete for limited facility maintenance and repair funding. New housing construction is currently only eligible for line-item construction funding (WASO Housing Program Support, personal communication, Oct. 6, 2022).

4.3.2 Employee Housing Limitations and Preferences

Over 70% of the parks reported difficulties housing varied types of employees. NPS policy requires Law Enforcement (LE) to be housed separately from non-LE due to concerns about firearm safety. Parks also choose not to house some groups together due to internal policies, including pairing supervisors with subordinates, employees with vastly different pay grades, and employees of different genders (NPS Housing Manager, personal communication, Sept. 19, 2022; GLAC Chief of Commercial Services, personal communication, Sept. 22, 2022).

From, GLAC staff and housing manager interviews, it was reported that employee housing expectations have shifted significantly over the past few decades. Fewer employees are willing to work for pay that fails to match both inflation and private sector rates. Employees now expect housing with internet access and single rooms. This shift in preference requires existing housing to be retrofitted with internet access (GLAC Chief of Commercial Services, personal communication, Sept. 22, 2022). Parks must consider what new amenities they need to provide to meet new employee expectations.

4.3.3 Distances from Local Communities Restrict Housing Options for Employees

Availability of housing in local communities is a limiting factor in providing external housing for many parks. Some parks reported communities more than two hours away, meaning living in local communities is not an option (NPS Housing Manager, personal communication, Sept. 16, 2022). The commute in areas around Glacier National Park can grow quickly due to low housing availability in nearby external communities, such as Kalispell (50 minutes), Columbia Falls (30 minutes) and Browning (35 minutes) (J. Foster, personal communication, Sept. 7, 2022). This forces employees to live even further from the park. GLAC policy states

employees living in Park provided housing must be within a sixty-minute commute, limiting GLAC's ability to house their employees in leased units in external communities (NPS, 2014).

4.3.4 Difficulties with External Renting Availability and Cost Limit Housing Opportunities

Employees at many parks throughout the NPS face difficulty finding local community housing. According to an interview with an NPS Housing Manager, most employees looking for jobs at these National Parks cannot afford the high rents in external communities. This leads to a shortage of employees at parks such as GLAC.

Nightly rentals have exploded in popularity around National Parks in recent years. In Montana, the number of available nightly rental units increased by 25 times between 2015 and 2020, a trend reflected near other National Parks (Bigart et al., 2021; NPS Housing Manager, personal communication, Oct. 4, 2022). A local real estate agent stated that a property manager's yearly income from one unit could double by converting month-to-month units into nightly rentals. For those longer-term rental units that exist in the area, the agent stated that they offer park employees an overall unpleasant experience. This is due to unit condition, long commute distances and a lack of a local community. Similar situations occurring throughout the NPS show that living in external communities is unfeasible for most of the parks' non-permanent employees.

4.3.5 Government Regulations Complicate Housing Options in the NPS

Certain government regulations have put a hold on strategies that GLAC could explore to expand their housing. One method of expanding housing is to convert underutilized office space into housing units, preventing new construction and ultimately saving funds. The Freeze the Footprint and Reduce the Footprint policies have made this transition unappealing to parks. These policies also apply to external properties, so the park is unable to use federal funds to lease office space outside the park and use existing internal office space for housing (J. Foster, personal communication, Aug. 30, 2022).

NPS regulations limit parks from signing leases longer than a year. San Juan Island NHP exclusively leases external housing for its employees and stated that if the NPS gave parks the permission to sign long-term leases, lessors would be more likely to partner with the Park Service.

The promise of long-term leases could entice landlords to rent to the NPS, and may be facilitated through the General Services Administration (GSA). The GSA supports the basic functioning of other federal agencies, including the NPS. The GSA may allow the NPS to sign long term leases of more than one year, while the Park Service is limited to sub-year leases when signing contracts on their own. San Juan Island NHP has started looking into GSA leasing as an option to expand their leasing for the park.

4.3.6 Lack of Communication Between Parks Limits Strategy Sharing

Throughout the process of our interviews with NPs and discussions with our sponsors, it was apparent that communication regarding housing challenges between NPs was uncommon. The Chief of Facilities at Mojave NP explained that without clear guidance and assistance from WASO, many of the parks are left without much support to solve these housing challenges.

5.0 Recommendations and Deliverables

This chapter lists our recommendations for GLAC administration to improve employee housing. These include recommendations for the short-term, long-term, and future partnership opportunities.

5.1 Short-Term Strategies to Improve Housing Availability

Presented below are short-term recommendations for GLAC to reduce the impact of the housing crisis. While many strategies require long lead times and years of planning, these recommendations can be applied to alleviate the housing crisis in the next five years. Our recommendations are to continue funding the School-to-Park program, explore external leasing opportunities and the WASO Park Lease Assistance program, and explore remote/hybrid work opportunities to enable conversion of office space to housing units.

5.1.1 Continue Funding the School-to-Park Program

We recommend this program be continued with Columbia Falls High School, and expanded to other high schools in Flathead and Glacier counties to increase positive impact. This program provides one 2-bedroom cabin each year and benefits both the students, who gain vocational experience, and the Park, who gain new housing. The Glacier NP Conservancy is in support and has helped fund the purchase of materials for this program, alleviating some of GLAC's funding concerns (Glacier NP Conservancy, personal communication, Sept. 29, 2022). We believe that there is potential to expand this program to other local high schools with interest and adequate student resources. Flathead and Glacier High School have partnered with the Flathead Valley Community College to introduce trade jobs to the students (Workforce Flathead, n.d.). If GLAC administration expands this program, it could significantly increase cabin production, with the potential to double or triple the yearly cabin output.

5.1.2 Explore External Leasing Opportunities

We recommend that leasing opportunities outside the Park be explored at both peak season and during the off-season. Some locations rented as nightly units during peak season are converted into monthly rentals during the off-season. If and when the opportunity comes, leasing should be considered to increase the Park's housing capacity. In our research, we discovered a

selection of local lessors with units outside the Park who would be willing to rent monthly to the NPS. A list of those contacts have been provided to GLAC administration.

We further recommend that GLAC Administration continue to pursue funding from the WASO Park Lease Assistance Program. If the funds can be appropriated, this program can be used to support the leasing of external housing units at little to no cost to the Park.

5.1.3 Explore Opportunities to Convert Office Space Into Housing Units by Shifting to Remote Work and Shared Office Space

We recommend that GLAC administration explore opportunities to convert office space back into housing units by shifting employees to working remotely. While many positions within the Park require a physical presence, some positions can be offered as a remote or semi-remote position. Such positions remove the need for employees to be provided Park housing or find housing in the local community. In addition, remote employees do not require office space in administrative areas that could be transitioned to housing. Remote work is also desirable for many employees in today's job market, expanding GLAC's ability to recruit qualified individuals for administrative positions (GLAC Chief of Concessioner Services, personal communication, Sept. 22, 2022).

We also recommend exploring shared office space within GLAC administration. If some office employees worked in a hybrid manner, office space can be shared by different employees on different days. Although this may be unfavorable for some office employees, it would enable the conversion of previously occupied office space to employee housing.

We further recommend the exploration of outside office leasing to reduce the need for office capacity in the Park for some employees. Such leases would allow further conversion of previous office space in administrative areas to employee housing. In order to best utilize large amounts of office space, the offices could be shared with other local government agencies.

5.2 Long-Term Strategies to Improve Housing Availability

We recommend two long-term strategies to provide sustainable housing for the future of Glacier National Park. These strategies will take much longer to be developed and implemented, but can impact the future and change the direction of GLAC's employee housing crisis. Our recommendations are to explore GSA funded leasing and to renegotiate concessionaire contracts to return internal housing to the Park.

5.2.1 GSA Funded Leasing

We recommend contacting the GSA to explore long-term leases in the local community. GSA funded leasing may be more enticing of an option for landlords. Landlords would be able to sign multi-year leases with the GSA instead of less than one year leases with GLAC (NPS Housing Manager, personal communication, Sept. 30, 2022). It is complicated to enroll in government leasing for landlords, so signing the lease every few years instead of at least once a

year is more enticing of an option for them (Local Property Manager, personal communication, Sept. 29, 2022).

5.2.2 Renegotiation of Concessionaire Contracts

We recommend the GLAC administration consider renegotiation of concessionaire contracts upon expiration. The Park's six concessionaires all use a portion of the Park's internal housing for their employees. These private entities have the ability to expand their external housing to accommodate their housing needs. Reducing the number of housing units assigned to park concessionaires will increase the quantity of beds inside the Park available to Park employees. The main limitation of this proposal is the requirement that concessionaires have the ability to be profitable in the Park, and requiring them to sponsor external housing may reduce this profitability significantly (GLAC Chief of Commercial Services, personal communication, Sept. 22, 2022). Since the concessionaires use a significant amount of the Park's internal housing stock, a shift in their housing scheme can benefit GLAC's internal housing situation. The main contract of interest with this strategy is with Xanterra, the Park's largest commercial services partner, expiring in 2031. Although this is a very long-term strategy, it is still one that should be considered due to its potential to return housing stock to the Park.

5.3 Partnership Recommendations

Presented below are partnership recommendations that would help GLAC add housing for their employees. 11 parks have created partnerships with local agencies and organizations to alleviate their parks' housing needs. Our recommendations are to expand talks with other government agencies for joint housing, and work with the Glacier Conservancy to fund housing in and around the Park.

5.3.1 Joint Housing with Government Agencies

GLAC administration should further explore joint housing construction or leasing with the US Forest Service (USFS) and Bureau Of Reclamation (BOR). GLAC has begun discussions with surrounding federal agencies regarding partnerships for joint housing. Both the USFS and the BOR have a need for expanded housing in the areas surrounding GLAC. Flathead National Forest has expressed interest in GLAC's School-to-Park program and has land they are looking to develop to support their housing needs. These entities are constrained by fewer regulations than the NPS for housing construction (P. Webster, personal communication, Sept. 29, 2022).

5.3.2 Glacier NP Conservancy Partnership

GLAC administration should explore funding housing options further with the Glacier National Park Conservancy. Conservancy funded employee housing has worked in other parks, and a variation of it may work for GLAC. Conversations with the Glacier NP Conservancy have indicated a willingness to consider funding housing projects if a strategic long-term plan is

proposed. While drafting project proposals, we recommend emphasizing that the preservation of the Park relies on its employees, for whom housing is essential.

We further recommend the exploration of a Park-Conservancy partnership for mutual employee housing. In an interview with the Park's conservancy, it was noted that the Glacier NP Conservancy also suffered from housing challenges (Glacier NP Conservancy, personal communication, Sept. 29, 2022).

5.4 Deliverables

Presented below are the two main deliverables that we gave to our sponsors at the conclusion of our research. The first deliverable is the NPS Strategy database that contains all housing manager interviews and the housing strategies they used. The second deliverable is the leasing decision matrix that will be used by GLAC administration to evaluate external leasing options outside the park.

5.4.1 NPS Interview and Strategy Database

All conducted surveys were compiled into a database to be shared throughout the NPS. Each park response has an individual sheet in the database that holds specific survey notes. Using this database, a user can look into any park and easily reach out to the interviewee. A strategy summary view also provides a snapshot of what the NPS as a whole is doing to address the employee housing crisis. This allows easy access to responses and shows what strategies parks have utilized for their employee housing. While some park's strategies won't work for others, anything that is widely used is worth exploring at GLAC.

5.4.2 Leasing Decision Matrix

GLAC Administration received the leasing decision matrix in its current form, shown in Appendix E. In the matrix, each criterion is given a rating from "poor" (1) to "excellent" (5) based on how well the option meets the criterion. Each criterion is also weighted based on overall importance to GLAC administration and project success. The matrix is populated with example weights, and can be edited by GLAC administration to enter their own weights and ratings for each criterion in the matrix. The rating and weight are multiplied together to generate a score for each criterion. Criteria scores are summed up for each category, and category scores are summed up to generate an overall score for each leasing option. With the weights and scores adjusted by the park administration, the resulting decision matrix should provide a metric for comparing different leasing options.

5.5 Conclusion

Over the past decades, GLAC has found it difficult to house all its employees. Through 46 interviews, we completed our project goal of recommending strategies for further exploration. Alongside these recommendations, we provided our database information obtained through interviews to GLAC administration and a leasing decision matrix. Further exploration of these

recommendations could significantly improve GLAC's housing stock and allow the park to hire an adequate amount of staff for full operation.

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Appendix A: Selected National Parks

Appendix A lists the parks contacted from every region.

Alaska Region:

Denali, Glacier Bay, Katmai, Kenai Fjords, Lake Clark, and Wrangell-St Elias.

Intermountain Region:

Arches, Big Bend, Black Canyon of the Gunnison, Bryce Canyon, Canyonlands, Capitol Reef, Carlsbad Caverns, Chaco Culture, Craters of the Moon, Curecanti, Grand Canyon, Grand Teton, Great Sand Dunes, Guadalupe Mountains, Hovenweep, Mesa Verde, Natural Bridges, Petrified Forest, Rocky Mountain, Saguaro, Tumacacori, White Sands, Yellowstone, and Zion.

Pacific West Region:

American Samoa, Channel Islands, Crater Lake, Death Valley, Great Basin, Golden Gate, Haleakala, Hawaii Volcanoes, Joshua Tree, Kings Canyon, Lassen Volcanic, Lava Bed, Mojave, Mount Rainier, North Cascades, Olympic, Oregon Caves, Pinnacles, Point Reyes, Redwood, San Juan Island, Sequoia, Bandelier, War in the Pacific, and Yosemite.

Midwest Region:

Apostle Islands, Badlands, Cuyahoga Valley, Effigy Mounds, Gateway Arch, Hot Springs, Indiana Dunes, International Peace Gardens, Isle Royale, Mount Rushmore, Pictured Rocks, Sleeping Bear Dunes, Theodore Roosevelt, Voyageurs, and Wind Cave.

Southeast Region:

Big Cypress, Biscayne, Canaveral, Cape Hatteras, Chickamauga & Chattanooga, Congaree, Cumberland Island, Dry Tortugas, Everglades, Great Smoky Mountains, Gulf Islands, Mammoth Caves, New River Gorge, and Virgin Islands.

Northeast Region:

Acadia, Assateague, Cape Cod National Seashore, Delaware Water Gap, Fire Island, Fredericksburg and Spotsylvania, Gateway, Gettysburg, Governors Island, Historic Jamestown, Katahdin Woods and Waters, Richmond Battlefield, Shenandoah, Statue of Liberty, and Yorktown.

National Capital Region:

Catoctin and US Capitol Complex.

Appendix B: Interview Script for Park Housing Management

Appendix B was the phone script to be followed when calling park headquarters to interview the park's housing manager.

If pickup:

Hello, am I speaking with <Contact>? [Wait] And are you the [Job Title] of [X parks]? [WAIT] This is <Name>. I'm a college student from Worcester Polytechnic Institute in Massachusetts working with Glacier National Park to address employee housing shortages. We are gathering information about employee housing solutions implemented at other national <Parks/Monuments/Historic Parks/Etc> around the country in the hopes of creating a national database of housing solutions. We have some questions that we would like to ask. Is this a good time for you? We expect this to take about 30 minutes. (wait for them to answer)

- If yes, GO TO confidentiality
- If no, GO TO no time to talk

In need of extension:

Hi, my name is <First Name>, I'm trying to get in contact with your <Job Title> <Name>. Are they available?

If Park HQ:

Hi, my name is <Name>, I'm working with Glacier National Park to address their employee housing issues. I am looking to connect with your park's housing or facilities manager to ask them a few questions regarding the status of housing in your park. Could you give me their name and contact information?

- If yes: Thank you! Are they in office right now, and could you transfer me? Thank you! GO TO pickup/voicemail
- If no: Alright, would you be able to transfer me? Thank you! GO TO pickup/voicemail

If voicemail:

Hello <Contact>, this is <Name>. I'm a student from Worcester Polytechnic Institute working with Glacier National Park to address the employee housing shortages at the park. My phone number is <phone number>, and my email address is <email address>. We are gathering information about employee housing solutions implemented at other national parks around the country in the hopes of creating a database of national park employee housing solutions. We were given your contact by <Alfredo Saenz/other>. We would love to talk to you about any information you can provide regarding this, so please call me back at <phone number> when you can, or email me at <email>. Thank you for your time, and we look forward to hearing from you.

Confidentiality:

Your participation in this interview is voluntary, and you may opt out at any time. Your answers to these questions ~~will not be confidential~~, and may be shared throughout the National Park Service, but not with the public. If you are interested, a copy of our results can be provided at the conclusion of the study. Do you agree with these terms?

- If yes, GO TO questions
- If no, GO TO confidential disagreement

No time to talk:

I'm sorry we've reached you at a bad time. Can we schedule a meeting before October 7th to talk about your <Park/Monument/Historic Park/Etc>?

Confidential disagreement:

Thank you for letting us know. Is there someone else who we could talk to in your office?

- If yes, get contact and GO TO pickup
- If no: "Thank you for your time. Have a nice day", and hang up.

Questions:

1. Can you tell us about the quantity of employee housing in your park?
 - a. What is the breakdown between seasonal vs full-time employee housing?
 - b. How many seasonal vs. permanent employees do you have?
2. Where and how are employees currently being housed?
 - a. Does your park provide housing within park borders?
 - b. Does your park provide housing outside of park borders?
 - c. Are employees expected to find and finance their own housing outside the park?
 - d. What types of housing do you have (apartments, dorm style, cabins, etc.)?
3. How great is the need for expanded employee housing in your park?
4. What steps have you taken to maintain or expand housing in the past or present?
 - a. Have you considered the options like the following?
 - i. Joint leasing with other agencies (like Q9) or your commercial services partner
 - ii. Collaboration with your conservancy (if any) to finance/build housing
 - iii. Housing at RV sites
 - b. Is there anything that didn't work out?
5. Where do you receive funding for new housing projects, housing rehabilitation, maintenance, or other housing-related projects?
6. What other innovative ways have you accommodated housing in your park? Things like tent or platform camping, RVs, tiny houses, trailers, etc.
7. Are you familiar with the WASO park lease assistance program?
 - a. Provides \$2,000,000 of out of park lease assistance made available by WASO
 - b. Have you developed a plan to apply for it?
 - c. Can you tell us anything about your application?

8. What is your relationship with local communities in relation to the housing needs of the Park?
9. What is your relationship to other government agencies with regard to the housing needs of the park?
 - a. How about your commercial services partner?
 - b. US Forest Service, Bureau of Reclamation, Bureau of Land Management, or others
10. Is there anything else you would like to share about our housing situation?

End of Interview:

Thank you for your time! If you have anything else you'd like to share with us at a later date, my email address is <email> and my phone number is <phone number>. Please feel free to reach out at any point. Thank you again!

Appendix C: Initial Email to Park Housing Management

Appendix C was the email script we used when initially reaching out directly to a park's housing manager.

Hello [Name],

We are a group of five juniors from Worcester Polytechnic Institute, in Worcester, Massachusetts. We are working at Glacier National Park for the next six weeks, and are working with park administration on a project exploring solutions to employee housing issues in the park. We understand this is a widespread issue faced by many national parks across the country, and we're interested in understanding solutions other parks have implemented to solve these issues. We were given your contact by [Jim Foster/Emily Keil/Erin Madsen/Alfredo Saenz], because they understand that you may have information about housing solutions at [Park Name].

If you are interested in setting up a phone call or Teams/Zoom meeting to discuss in further detail, we would be more than happy to work with you to set that up. If for any reason you would prefer email, we are happy to do that as well.

Thank you for your time!

Sincerely,

<Name>

<Number>

GLAC Housing Team

Appendix D: Secondary Email to Park Housing Management

Appendix D was the email script interviewing the housing manager contact at a specific park.

Hi again,

Thank you so much for your response! There are several questions we hope you can help us with. Your answers to these questions may be shared within the National Park Service, but not with the public. If you are interested, a copy of our results can be provided by GLAC Facility Manager Jim Foster (jim_foster@nps.gov) at the conclusion of the study.

1. Can you tell us about the quantity of employee housing in your park?
 - a. What is the breakdown between seasonal vs full-time employee housing?
 - b. How many seasonal vs. permanent employees do you have?
2. Where and how are employees currently being housed?
 - a. Does your park provide housing within park borders?
 - b. Does your park provide housing outside of park borders?
 - c. Are employees expected to find and finance their own housing outside the park?
 - d. What types of housing do you have (apartments, dorm style, cabins, etc.)?
3. How great is the need for expanded employee housing in your park?
4. What steps have you taken to maintain or expand housing in the past or present?
 - a. Have you considered the options like the following?
 - i. Joint leasing with other agencies (like Q9) or your comm. services partner
 - ii. Collaboration with your conservancy (if any) to finance/build housing
 - iii. Housing at RV sites
 - b. Is there anything that didn't work out?
5. Where do you receive funding for new housing projects, housing rehabilitation, maintenance, or other housing-related projects?
6. What other innovative ways have you accommodated housing in your park? Things like tent or platform camping, RVs, tiny houses, trailers, etc.
7. Are you familiar with the WASO park lease assistance program?
 - a. Provides \$2,000,000 of out of park lease assistance made available by WASO
 - b. Have you developed a plan to apply for it?
 - c. Can you tell us anything about your application?
8. What is your relationship with local communities in relation to the housing needs of the Park?
9. What is your relationship to other government agencies with regard to the housing needs of the park?
 - a. US Forest Service, Bureau of Reclamation, Bureau of Land Management, etc
10. Is there anything else you would like to share about your park's housing situation that you feel would be useful in understanding your park's specific housing issues?

Thank you again!

Sincerely,

<name>

GLAC Housing Team

Appendix E: Leasing Decision Matrix

Appendix E contains the leasing decision matrix used to analyze external leases for GLAC administration, with sample weights.

Leasing Decision Matrix:			Property 1		Property 2	
Category:	Criteria:	Weight:	Rating:	Score:	Rating:	Score:
Costs	Gross Monthly Cost	50		0		0
	Gross Monthly Rental Income	30		0		0
Cost Score:				0.0		0.0
Renting Feasibility	Property Availability	40		0		0
	Number of Units Available	30		0		0
	Landlord Willingness to Rent	50		0		0
Feasibility Score:				0.0		0.0
Accessibility	Accessibility for individuals	10		0		0
	Accessibility for vehicles	20		0		0
	Commute	20		0		0
	Distance from towns	20		0		0
Accessibility Score:				0.0		0.0
Quality & Ammenities	Kitchen	20		0		0
	Bathroom	10		0		0
	Laundry	10		0		0
	Safety	20		0		0
	Internet Access	15		0		0
	Personal Privacy	20		0		0
Quality & Ammenities Score:				0.0		0.0
Covered Residents	Families with children	10		0		0
	Couples	10		0		0
	Singles	10		0		0
Covered Residents Score:				0.0		0.0
Overall Score:				0.0		0.0

Appendix F: Response Rates for External Leasing Research

Appendix F shows the total units contacted, units that responded, units that expressed interest in renting to GLAC, and units that had availability.

	Total units contacted:	Units responded:	Units that showed interest:	Units that showed interest and had availability for the season:
Numbers	30	18	18	16
Percentage	100%	60%	60%	53.33%

Definitions:

Interest: The lessor's interest in renting that unit to the park, either for six months or a year.

Availability for the season: The unit's availability from May to October 2023.